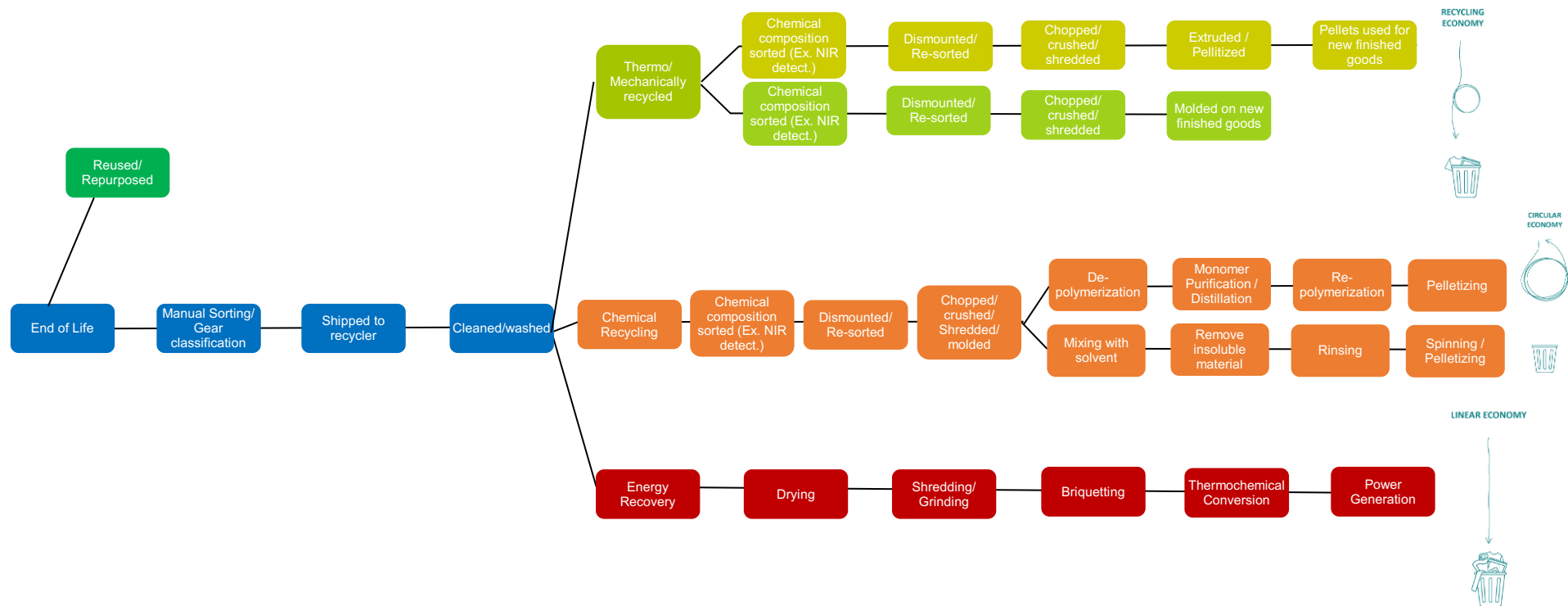


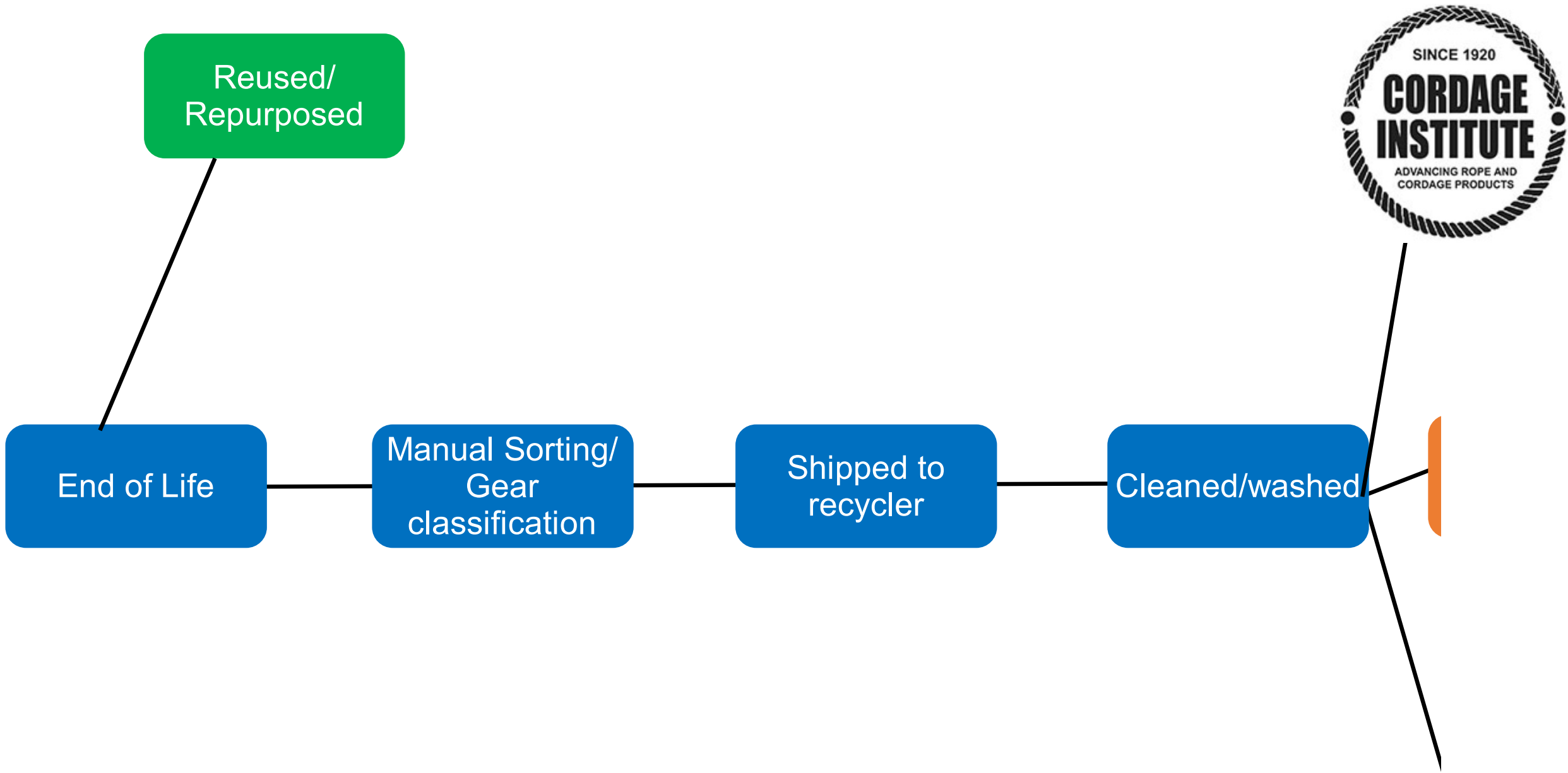


Thermo-mechanical recycling does not allow impurities such as additives, dyes, fillers, etc. to be removed. These, in fact, will accumulate with each recycle, worsening the quality characteristics (including the colour itself, which will tend increasingly to black). In addition, the thermo-mechanical process mechanically and thermally stresses the polymer chain, degrading it at each step and thus reducing its length and various aspects, such as viscosity and different mechanical characteristics. Hence, these recycled polymers, in order to be reused and re-proposed on the market for applications similar (but never equal) to the original ones, will need to be applied in quantities (10-20%) without significantly depressing the quality of the finished product with respect to an equivalent obtained from the virgin product.

Chemical recycling is not applicable to any polymer but only to some (e.g. PA6 - see the case of AQUAFIL with ECONYL (R)). Chemical recycling with depolymerisation allows, in the monomer purification step, impurities such as additives, dyes, fillers etc. to be removed. With this depolymerisation process, the polymer chains are disassembled into many 'monomer' elements. Then, from this, the pure monomer is recovered, which is purified through multiple distillation/purification processes. Then, starting from the monomer obtained in this way, polymerisation of the monomer is carried out, thus making it possible to obtain (if desired) products with polymer chains even longer than the starting ones and to be able to manage the quality of the resulting product to even higher levels than the starting ones. Chemical recycling with a solubilisation process involves the solubilisation of the polymer in a specific solvent and thus makes it possible to remove the insoluble parts. However, not all impurities are always insoluble (often dyes are not) and further purification processes are required to remove them. Thanks to this process, much less stress is placed on the polymer chains and the resulting product will therefore have similar characteristics to the starting product. These recycled polymers can then be recycled many more times or even infinite times (in the case of depolymerisation) and will have similar or even (again only in the case of depolymerisation) superior characteristics.

Energy recovery of materials does not in any way fall among the possible circularity or recycling schemes and as such must be considered as an alternative to landfilling as a last option.





Reused/
Repurposed

End of Life

Manual Sorting/
Gear
classification

Shipped to
recycler

Cleaned/washed



Thermo/
Mechanically
recycled

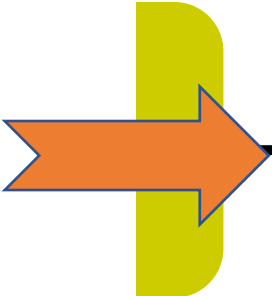
Chemical
composition
sorted (Ex. NIR
detect.)

Dismounted/
Re-sorted



Chopped/
crushed/
shredded

Extruded /
Pellitized



Pellets used for
new finished
goods



